Agenda item : F-2.1

38th Argos Operations Committee
Prepared by CLS
Date : May, 10th 2004

OPERATIONS REPORT

1. Ground receiving stations

1.1. Global stations

- The two global stations able to acquire the STIP telemetry are still the Fairbanks and Wallops Island stations.

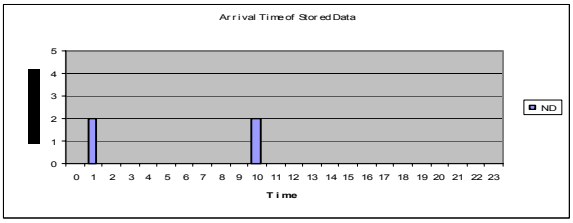
- The Lannion global station, which could also acquire the STIP telemetry in some conditions, is no more used since the year 2000. Despite all our efforts to convince NOAA, it seems to be difficult to restart the STIP downloads over Lannion. A solution with the antenna located in Barrow was suggested. However, no action or test has been performed up to now.

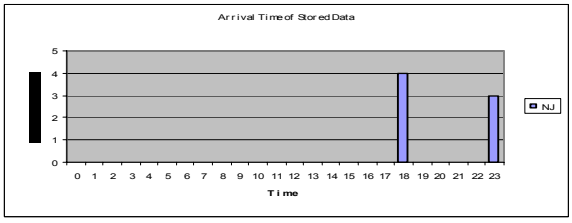
- The two global stations of Fairbanks and Wallops deliver the STIP telemetry from the satellites NOAA-11, NOAA-12, NOAA-14, NOAA-15, NOAA-16 and NOAA-17.

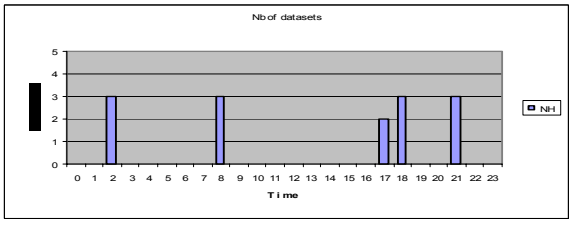
- As regards NOAA-12, only two orbits per day are delivered by NOAA/NESDIS. It is just enough to collect the minimum amount of data from the orbitography Argos beacons required for the processing of the Argos location.

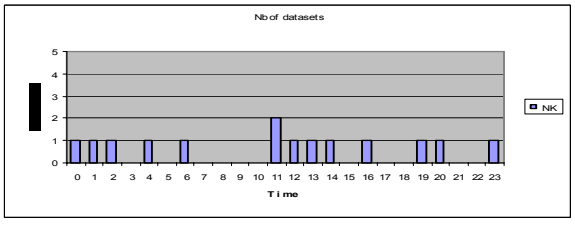
- The STIP telemetry from NOAA-11 – the only type of telemetry available for this satellite – is delivered by group of three or four orbits. Since the end of 2003, it is the same for NOAA-14.

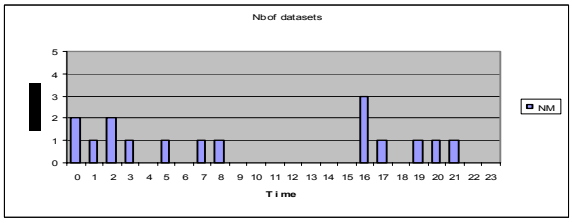
Figure 1 shows STIP data set arrival times at the Toulouse and Largo processing centers. Ideally, one data set should be received every 100 minutes.











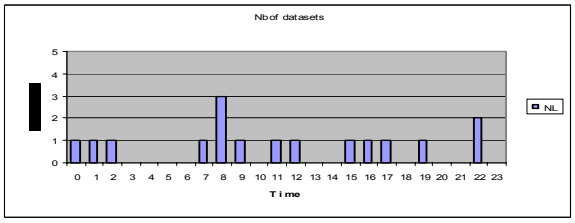


Figure 1

Figure 2 shows the satellite orbit plans in April 2004.

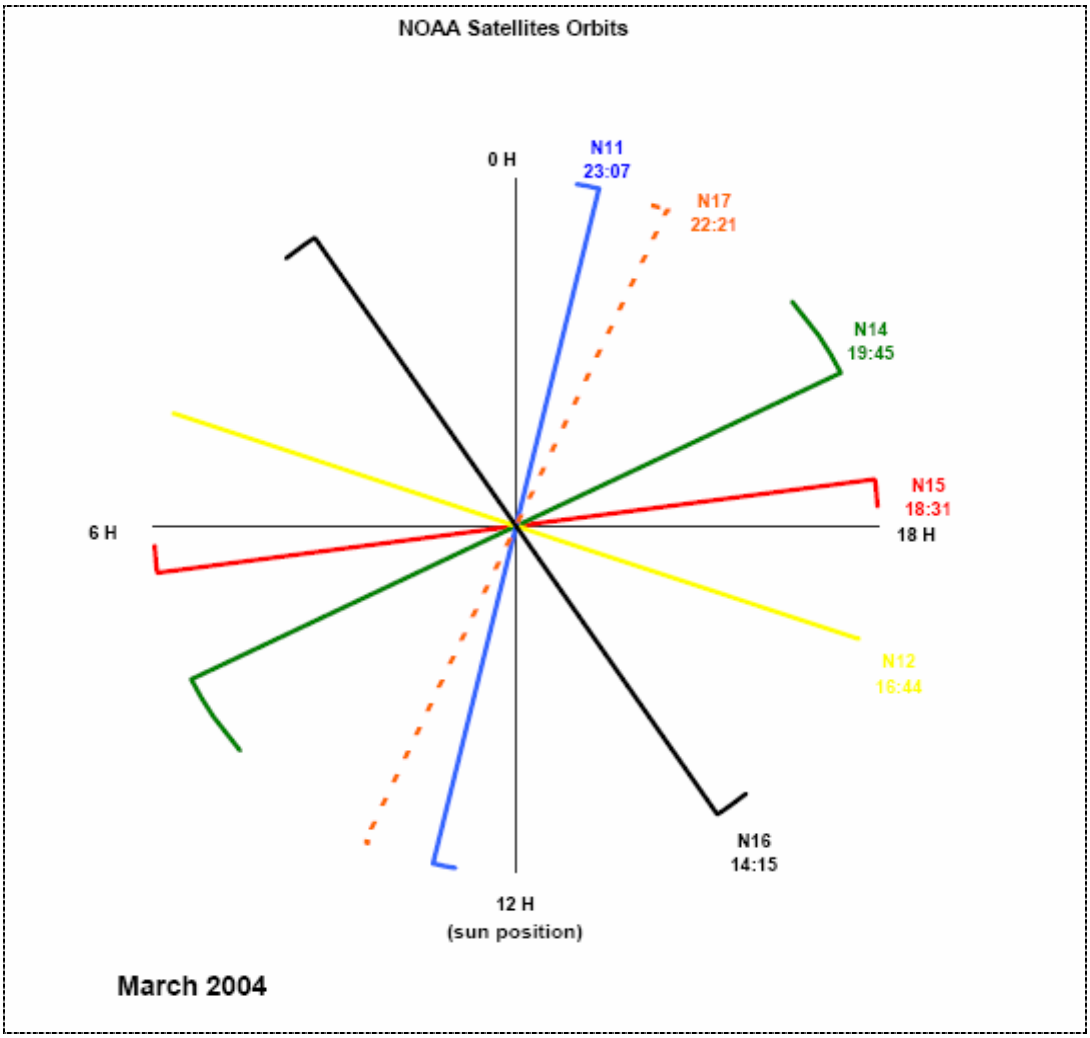


Figure 2

Since the loss of ADEOS-2 on October 25th, 2003, the Argos constellation includes 6 satellites and the data are distributed as follows:

- Basic service: NOAA-17, NOAA-16
- Multi-satellite service: NOAA-17, NOAA-16, NOAA-15, NOAA-14, NOAA-12 and NOAA-11.

1.2. Regional stations

CLS and Service Argos Inc. pursued their efforts in 2003 to increase the number of receiving stations able to provide TIP data sets from the NOAA satellites. Seven new stations joined the Argos network during the year. They are in Antartica Chile, Meteo Chile), Athenes (Greece, CLS), Fidji (Fidji, FMS), Punta Arena (Chile), Riyad (Saudi Arabia, CACST), Sondre (Greeland, DMI) and Tromsoe (Norway, NMI).
There are currently 40 stations delivering TIP data sets to CLS and Service Argos Inc. Most of them process data from NOAA-16, NOAA-17, NOAA-15, NOAA-14 and NOAA-12, so we are able to maintain good throughput times for delivery of results.
For the year 2004, we have some projects for antennas located in Indonesia, China, Guam, …

List of regional receiving stations

	Antennas	Country	Operator	Satellites
1	Antartica	Chile	Meteo Chile	, , N15, N14, N12
2	Athenes	Greece	CLS	N17, N16, N15, N14, N12
3	Aussaguel	France	CLS	N17, N16, N15, N14, N12
4	Buenos Aires	Argentina	INTA	N16, N15, , N14, N12
5	Cape Town	South Africa	CLS/SAWB	N17, N16, N15, N14, N12
6	Casey	Australia (Antarctica)	BOM	, N16, N15, N14, N12
7	Cayenne	France (Guyana)	IRD	, N16, N15, N14, N12
8	Darwin	Australia	BOM	, N16, N15, N14, N12
9	Edmonton	Canada	Envir. Canada	N17, N16, , N14, N12
10	Fidji	Fidji	FMS	, , N15, N14,
11	Gilmore	USA	NOAA/NESDIS	N17, N16, N15, N14, N12
12	Halifax	Canada	Can. Coast Guard	N17, N16, N15, N14, N12
13	Hatoyama	Japan	NASDA/EOC	, N16, N15, N14, N12
14	Hawaï	USA	NOAA/NWS	, , , N14, N12
15	Helsinki	Finland	CLS	N17, N16, N15, N14, N12
16	Ile de la Réunion	France (Reunion Island)	Météo France	, N16, , N14,
17	Ile de la Réunion	France (Reunion Island)	IRD	, N16, N15, N14, N12
18	Lannion	France	Météo France	, N16, N15, N14,
19	Largo	USA	SAI	N17, N16, N15, N14, N12
20	Las Palmas	Canaries Island	Univ. Las Palmas	, N16, N15, N14, N12
21	Las Palmas	Canaries Island	CLS	N17, N16, N15, N14, N12
22	Lima	Peru	CLS perù	N17, N16, N15, N14, N12
23	Melbourne	Australia	BOM	, N16, N15, N14, N12
24	Miami	USA	NOAA/AOML	N17, N16, N15, N14, N12
25	Monterey	USA	NESDIS/NWS	, N16, , , N12
26	Murmansk	Russia	Complex System	, N16, N15, N14, N12
27	Noumea	France (New Caledonia)	IRD	, N16, , N14, N12
28	Oslo	Norway	NMI	, N16, N15, N14, N12
29	Perth	Australia	BOM	, N16, N15, N14, N12
30	Petropavlosk	Russia	Rybradiov	, N16, N15, N14, N12
31	Punta Arena	Chile	Meteo Chile	, , N15, N14, N12
32	Riyad	Saudi Arabia	CACST	N17, N16, N15, N14, N12
33	Santiago	Chile	Meteo Chile	, , N15, N14, N12
34	Singapore	Singapore	NEA	, N16, N15, N14, N12
35	Sondre	Greenland	DMI	N17, N16, N15, N14, N12
36	Tokyo	Japan	Jamstec	, N16, N15, N14, N12
37	Toulouse	France	CLS	N17, N16, N15, N14, N12
38	Tromsoe	Norway	KSAT	N17, N16, N15, N14, N12
39	Wallops	USA	NOAA/NESDIS	N17, N16, N15, N14, N12
40	Wellington	New-Zeland	Met Office	, N16, N15, ,

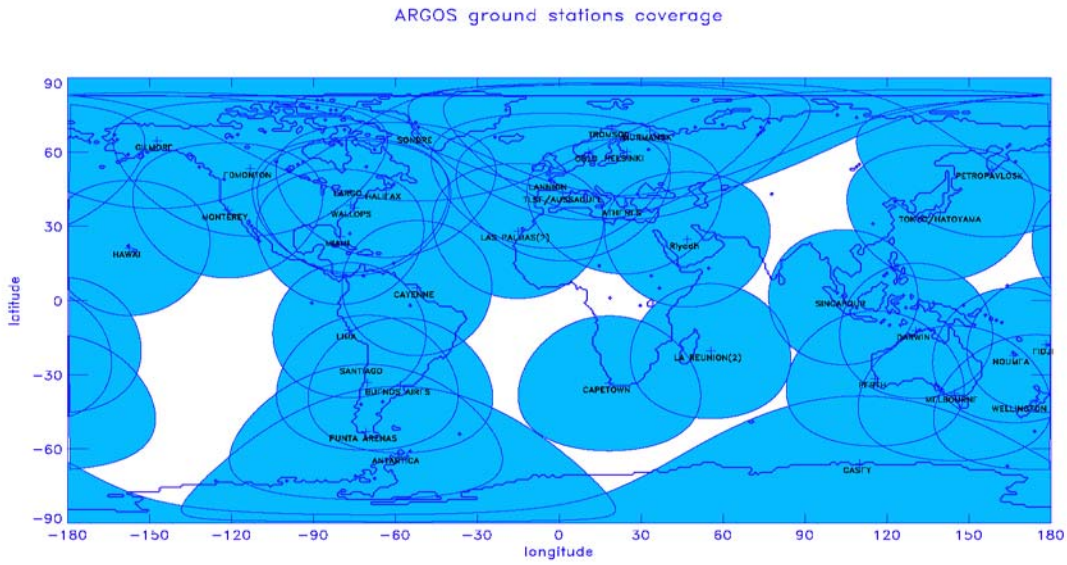


Figure 3

1.3. Processing centers

Each of the five Argos processing centers—in Toulouse, Largo, Melbourne, Tokyo, and Lima—operated without a major hitch in 2003.

The two global processing centers in Toulouse and Largo continue to process data sets from all receiving stations, handling over 650 data sets per day (see Figure 4). The regional processing centers in Melbourne, Tokyo, and Lima only process data sets from stations covering their region. Supplementary data providing global coverage are supplied by the Toulouse center or by the Largos center if necessary.

Figure 4

The number of Argos platforms operating continues to increase. In April 2004, more than 6000 platforms were seen on average per day (figure 5). However, each of the two global centers processed data from 12000 individual platforms during this month.

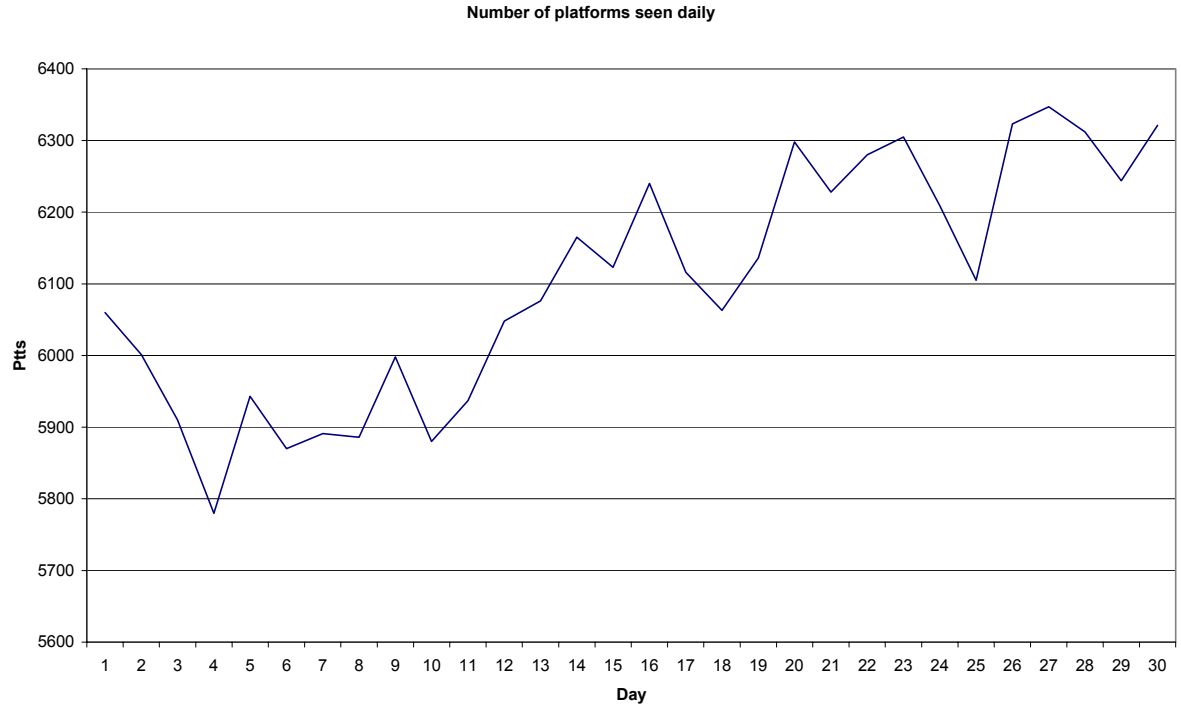


Figure 5

Figures 6 and 7 below show the number of locations and messages computed every day by the Largo and Toulouse centers.

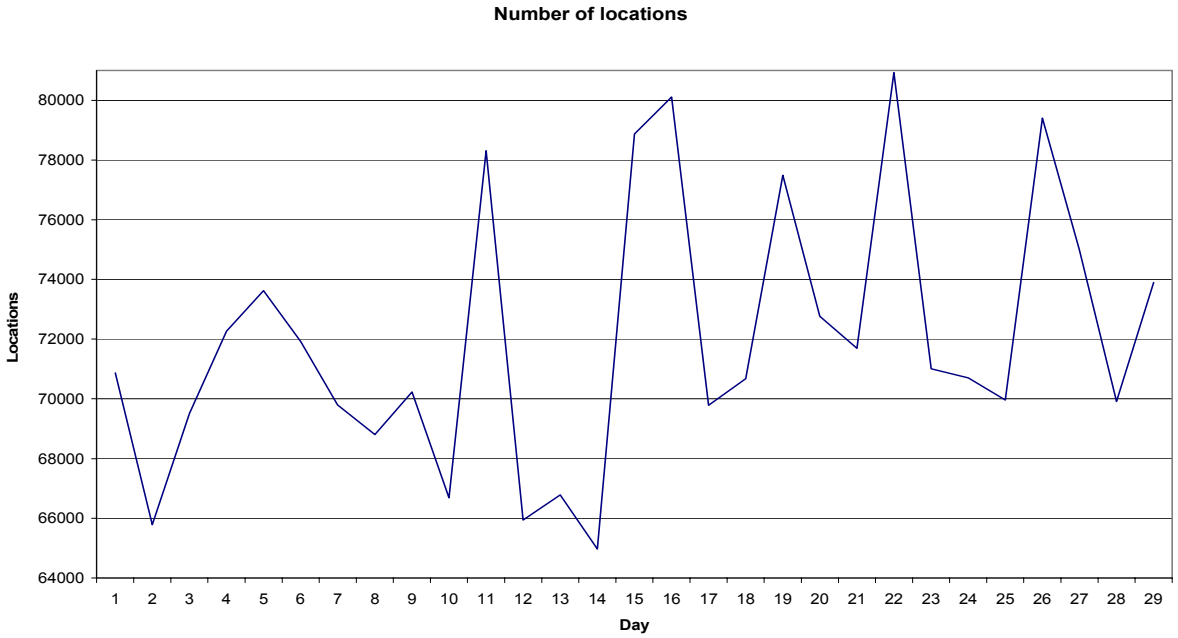


Figure 6

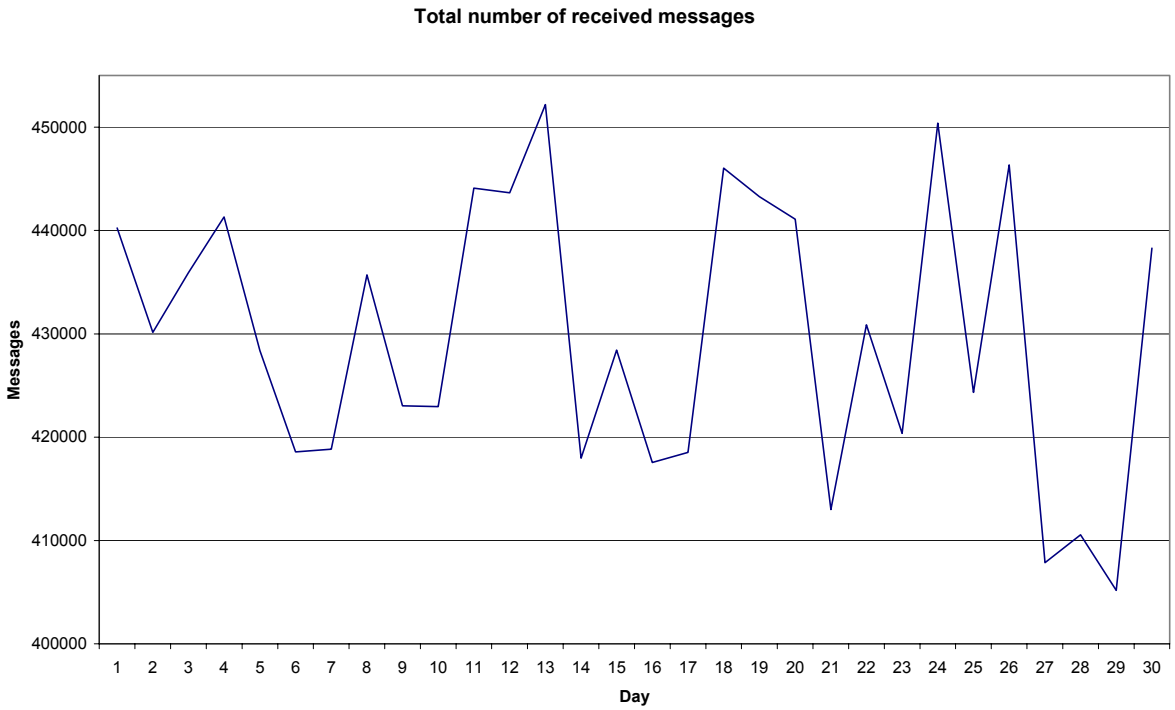


Figure 7

2. Communication links

The Internet is the main communication link used to distribute processed data to users and to retrieve data sets from receiving stations. The Toulouse center has now a double access (2 Mbits + 2 Mbits) which improve the reliability of our communication facilities. The same has been done at the Largo center in 2003.

The X25 protocol has been stopped at Service Argos Inc but continues to be used by the Toulouse center to send data to a few users (less than 20) concerned by security reasons.

3. Throughput time for delivery results

CLS throughput times for delivery of results should be calculated in terms of the time taken to reach end users.
For each message received by the satellite, we compute the data turnaround time/data availability which is the time elapsed between the recording of the message on board the satellite and processing of the same message by the global processing center.

Figure 8 shows the throughput time for delivery of results for stored data from NOAA-17, NOAA-16 and NOAA-15.
59% of the data are available within two hours while 81% of the data are available within three hours.

We can correlate these statistics with those produced by NOAA, which computes data set delivery times to the Argos Global Processing Centers, while CLS computes result delivery times to Argos users. These results delivery times include the orbital delay, the time taken by NOAA to deliver data sets and the time taken to process them by the Argos global processing centers.

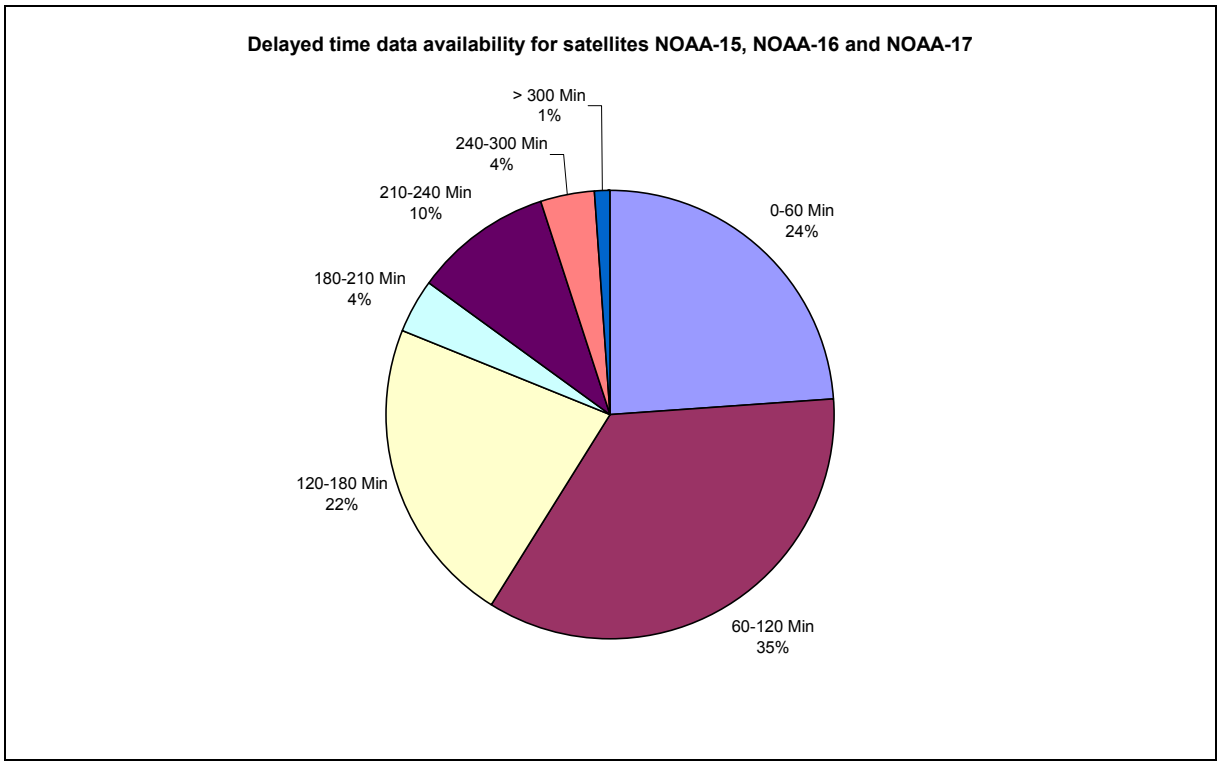


Figure 8

Figure 9 shows the throughput time for delivery of results for stored data from NOAA-11 and NOAA-14.
48% of the data are available within three hours as opposed to 81% for the satellites NOAA-17, NOAA-16 and NOAA-15. This delay is due to the NOAA data set delivery times.

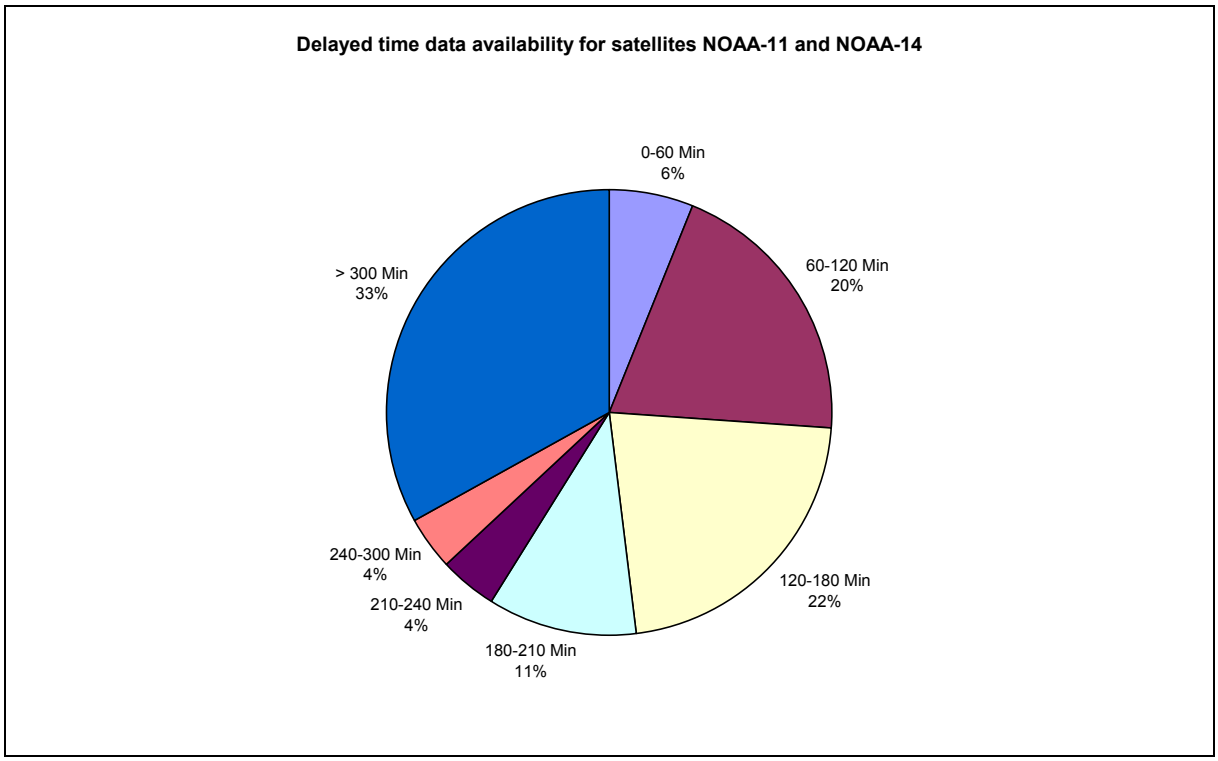


Figure 9

Figure 10 shows the throughput time for delivery of results for real-time data from NOAA-17, NOAA-16, NOAA-15, NOAA-14 and NOAA-12 and acquired by the 33 HRPT receiving stations.

96 % of these real-time data are available within 30 minutes.

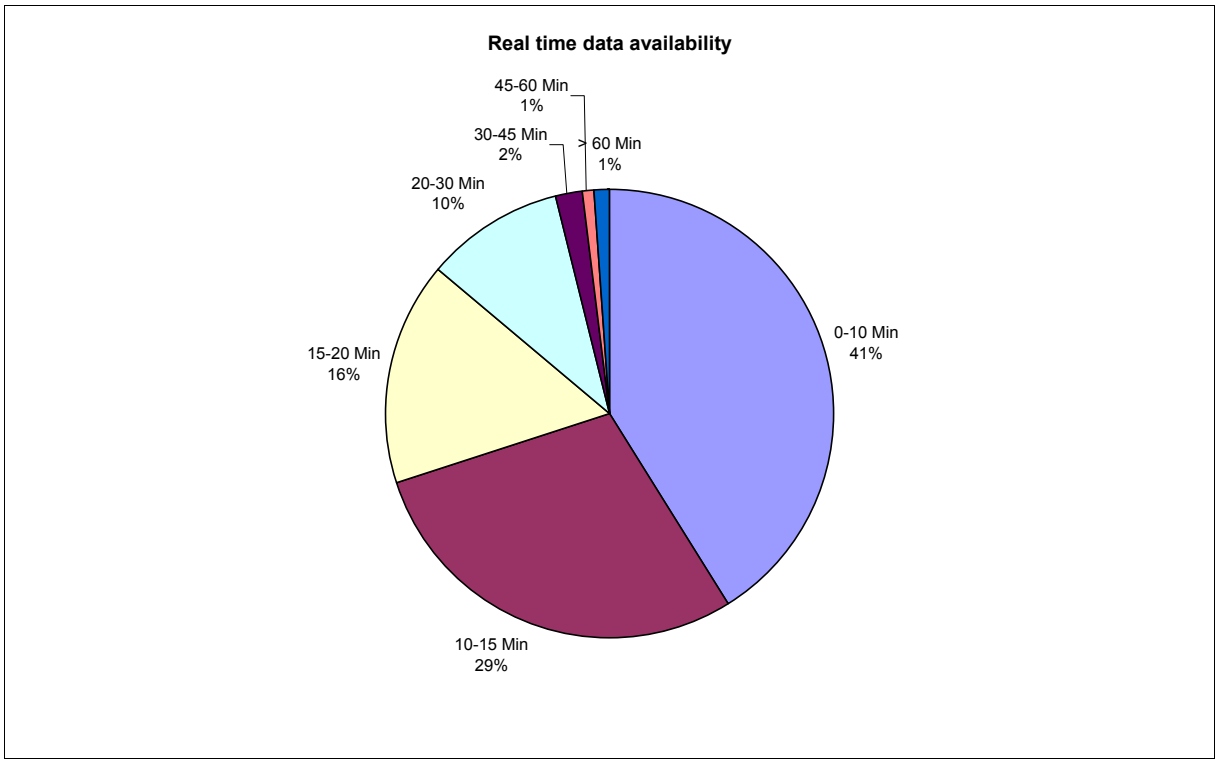


Figure 10

The throughput time for delivery of results for real-time data includes three main delays:

- the satellite pass duration, because we have to wait for the end of the pass to transfer and process the data set;
- the time taken to transfer the data set to the global processing centers. Most transfers go over the Internet. The transfer rate is getting better and better.
- the time taken to process the data set by the global processing centers, which is not significant (less than 30 seconds).